

CLAIMS

What is claimed is:

1. An isolated amino acid sequence of SEQ ID NO: 4.

5 2. A method of identifying a molecule involved in bone modulation comprising identifying a molecule that binds to, or that inhibits binding of a molecule to, HBM.

3. The method of claim 2, wherein said molecule is a protein.

10 4. A method for identifying a protein involved in bone modulation comprising identifying a protein that has an expression level that is different in a first host comprising the Zmax1 gene when compared to a second host comprising the HBM gene.

5. The method of claim 4, wherein the host is a cell or an animal.

15

6. A method of identifying a candidate protein involved in bone modulation comprising

identifying a protein in a first individual having the high bone mass phenotype;

identifying a protein in a second individual not having the high bone mass

20 phenotype;

comparing the protein of the first individual to the protein of the second individual, wherein (i) the protein that is present in the first individual but not the second individual is the candidate protein or (ii) the protein that is present in a higher amount in the first individual than in the second individual is the candidate protein or (iii) the protein that is present in a lower amount in the first individual than in the second individual is the candidate protein.

25

7. The method of claim 6, further comprising producing an antibody to the candidate protein.

8. A method of identifying a candidate protein involved in bone modulation
5 comprising

identifying a protein in a first individual having the high bone mass phenotype;

identifying a protein in a second individual not having the high bone mass
phenotype;

comparing the protein of the first individual to the protein of the second individual,
10 wherein (i) the protein that is present in the second individual but not the first individual is
the candidate protein or (ii) the protein that is present in a higher amount in the second
individual than in the first individual is the candidate protein or (iii) the protein that is
present in a lower amount in the second individual than in the first individual is the
candidate protein.

15

9. The method of claim 8, further comprising producing an antibody to the candidate protein.

10. A method of testing for HBM activity comprising immobilizing an HBM
20 protein, binding a protein to the HBM protein, and measuring the extent of binding.

11. The method of claim 10, wherein the protein is ApoE.

12. A method of pharmaceutical development for treatment of bone development
25 disorders comprising identifying a molecule that binds to the amino acid sequence of SEQ

ID NO: 4.

13. The method of claim 12, wherein the molecule inhibits or enhances the function of the amino acid.

14. A method of altering bone development in a host comprising administering
5 the amino acid sequence of claim 1 to a somatic cell of a host suffering from a bone development disorder.

15. The method of claim 14, wherein the host is a human or another vertebrate.

10 16. A method of altering bone development in a host comprising administering the amino acid sequence of claim 1 to a germ-line cell in a host suffering from a bone development disorder.

15 17. The method of claim 16, wherein the animal is a human or another vertebrate.

18. A method of treating osteoporosis comprising administering the amino acid sequence of claim 1 to a patient in need thereof.

20 19. The method of claim 18, wherein the patient is a human or another vertebrate.

20. A method of treating osteoporosis comprising administering the extracellular domain of the amino acid sequence of claim 1 to a patient in need thereof.

25

21. The method of claim 20, wherein the patient is a human or another vertebrate.

22. A method of treating osteoporosis comprising administering the intracellular
5 domain of the amino acid sequence of claim 1 to a patient in need thereof.

23. The method of claim 22, wherein the patient is a human or another vertebrate.

10 24. A method for treating bone development disorders comprising administering an antibody to a patient in need thereof, wherein the antibody is to the amino acid sequence of claim 1.

25. A diagnostic assay for bone development disorders comprising an antibody
15 to the HBM protein.